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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,029	03/13/2001	Takuya Hirano	010294	8139

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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

EXAMINER

PICH, PONNOREAY

ART UNIT	PAPER NUMBER
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2135

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/787,029	HIRANO, TAKUYA	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ponnoreay Pich	2135	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 June 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 15-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 15-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/15/2006 has been entered.

Claims 1 and 15-24 are pending. Applicant's amendments have been noted.

### ***Response to Arguments***

Applicant's arguments have been fully considered. Only arguments that are still relevant with regards to the new rejections made below will be addressed as applicant's amendments and the new rejections made below render many of applicant's arguments moot.

The examiner notes that with regards to point 8 of 112, second paragraph rejections made by the examiner in the prior office action, applicant argues that the wherein clauses that the examiner questioned whether or not should be given patentable weight are directed towards aspects of the invention, thus should be given patentable weight. The examiner notes that as per MPEP 2111.04 certain languages such as wherein clauses do not always limit a claim. However, as applicant has come on record stating that the wherein clauses recited in the claims define the invention and should be given patentable weight, the examiner will do so.

On page 19 of arguments submitted by applicant, applicant argues Kahn discloses how information is encoded in phase shifts and how the local oscillator is related to symbols in phase, but does not disclose how information is decoded, thus does not disclose “wherein said phase difference is assigned to bit 0 or bit 1 by comparing said difference signal with threshold values which are determined from a quantum–mechanical probability distribution of said difference signals obtained from a set of said phase differences assigned bit 0 or bit 1. With regards to the limitation under contention, the examiner respectfully does not see how whether or not Kahn discloses how information is decoded is relevant to the limitation under contention. The passage cited by both the examiner and applicant shows bit 1 or bit 0 being represented by phase shifts, thus the passage appears to read on assigning bit 0 or bit 1 to a signal. Clarification by applicant is respectfully requested.

### ***Claim Objections***

Claim 1 is objected to because of the following informalities:

1. Claim 1 recites “it” on lines 3 and 7. The examiner respectfully suggests replacing “it” with “the quantum cipher communication system” as the examiner assumes that is what “it” is referring to.
2. As per claim 15, there should be a “to” before “either” in lines 26 and 29. Also “a” after “each” on line 38 should be deleted.
3. The clause recited on lines 9-10 of claim 10 is objected to as the examiner believes applicant mean something more along the lines of: “said transmission

path comprising a pair of paths for transmitting said weak signal light and said intense reference light respectively". Note that at least two "a transmission path" has been recited, thus it is unclear which transmission path is being referred to by "said transmission path" as applicant currently has written the clause. A similar problem exists with regards to "said light source" recited in claim 17 and "said pair of photodiodes" in claim 17.

4. The last two limitations recited in claim 17 are redundant as they are already recited in claim 15. Claim 17 depends from claim 15, thus the last two lines should be deleted in claim 17.
5. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1. As per claim 15, the clauses describing the phase modulation means of the sender's apparatus and receiver's apparatus are indefinite (see beginning on lines 9 and 14 of claim 15). As currently recited it appears that what applicant is stating is that the phase modulation means makes either the weak signal light or intense reference light a phase change. It is unclear how light can be made a phase change. The examiner assumes applicant may have meant something

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more along the lines of imparting a phase change or causing a phase change onto the recited lights?

2. As per claim 17, the clause beginning on line 28 is indefinite. As currently recited, it appears that applicant is stating that the phase modulator makes said weak signal light a phase change, see lines 30-31. It is unclear how light can be a phase change.
3. Claim 19 recites "said phase modulation" to transmit said privacy keys. It is unclear which phase modulation is being referred to as phase modulation occurs in both the sender's apparatus and the receiver's apparatus. A similar problem exists with the recitation of "said phase modulation" in claim 20.
4. Any claims not specifically addressed are rejected by virtue of dependency.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett (US 5,307,410) in view of Kahn and further in view of Phoenix et al (WO 94/08409).

#### **Claim 1:**

As per claim 1, Bennett discloses:

1. The quantum cipher communication system uses a phase difference between a weak signal light which is so weak that a change in said weak signal light's quantum mechanical state is detectable and an intense reference light for communicating a privacy key, wherein said phase difference is produced by a sender and a recipient adding a phase on said weak signal light or said intense reference light (col 5, lines 53-60; col 6, lines 30-37; col 7, lines 1-18; col 8, lines 6-28; and col 10, lines 3-11).
2. The quantum cipher communication system has a detector which detects said phase difference as a difference signal of said detector (col 7, lines 1-13).
3. Wherein eavesdropping is detected (col 9, lines 48-60).

Bennett does not explicitly disclose:

1. Wherein said difference signal is assigned to bit 0 or bit 1 by comparing said difference signal with threshold values which are determined from a quantum-mechanical probability distribution of said difference signals obtained from a plurality of said difference signal assigned bit 1 or bit 0.
2. Wherein an eavesdropping is detected by said recipient measuring a change in said quantum-mechanical probability distribution of said difference signal, which is produced by the eavesdropping operation.

However, regarding item 1 which Bennett does not teach, the limitation is taught by Kahn (col 2, line 61-col 3, line 6). Regarding item 2 which Bennett does not teach, the limitation is taught by Phoenix (p22, lines 4-20 and p28, lines 6-19).

At the time applicant's invention was made, it would have been obvious to one skilled in the art to modify Bennett's invention according to the limitations recited in claim 1 in light of what is taught by Kahn and Phoenix. One skilled would have been motivated to incorporate Phoenix's teachings because Bennett discloses that he is interested in detecting eavesdropping (col 9, lines 48-60). While Bennett's invention is capable of detecting one type of eavesdropping, incorporating Phoenix's teachings within Bennett would result in a more secure system as other types of eavesdropping could also be detected. One skilled would have been motivated to incorporate Kahn's teachings because Kahn's teachings would result in a more sensitive detector, thus increasing the likelihood that eavesdropping would be detected since a more sensitive detector would allow phase differences to be detected more easily.

### ***Allowable Subject Matter***

Claim 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 16-24 are dependent on claim 15 either directly or indirectly, thus would also be allowable if the above noted 112, second paragraph problems and objections were fixed.



**Conclusion**

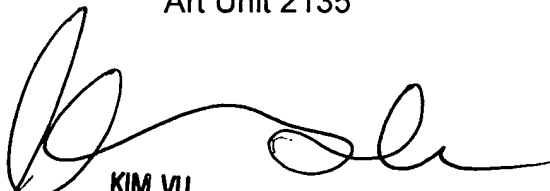
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ponnoreay Pich whose telephone number is 571-272-7962. The examiner can normally be reached on 9:00am-4:30pm Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Vu can be reached on 571-272-3859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ponnoreay Pich  
Examiner  
Art Unit 2135

PP

  
KIM VU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100